

## DUST SPHERES

### A REPORT ON THEIR OCCURRENCE IN SOUTHEAST ARKANSAS

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#### 1. INTRODUCTION

As far as is known dust spheres are an unusual phenomenon. This report describes an occurrence of atmospheric dust spheres and the observations made of them. Physical description and measurements are presented but no speculation or hypothesis regarding the origin or manner of formation of the dust spheres is attempted.

#### 2. HOW AND WHERE OBSERVED

The dust spheres were trapped entirely by accident, incidentally to the study of air-borne pine pollens at the Crossett Experimental Forest, a Branch of the Southern Forest Experiment Station. Specifically, the dust was caught 6 miles south of Crossett, Ark., at approximately 33° N. latitude and 92° W. longitude.

Two pollen traps were used, which consisted of standard microscope slides on which were affixed strips of cellophane scotch tape with the sticky surface facing upward. One slide was placed in an open field which allowed full sweep of the wind and the other was located in a grove of large pine trees where wind movement was greatly reduced. Both slides were exposed concurrently beginning at 7:45 a. m., April 1, 1955, and ending 9:00 a. m., April 3, 1955.

Weather conditions are recorded daily by instruments in place on the station grounds. Between 3:00 a. m. and 7:00 a. m. on April 1, 0.44 inch of rain was recorded. The traps were exposed three-quarters of an hour after precipitation ceased. On April 1 the sky was cloudy; maximum temperature was 74° F., and minimum was 51° F. An 8-m. p. h. wind blew from the southwest. On April 2 the sky was partly cloudy; temperatures ranged from 71° F. to 41° F. The wind was from the north at about 4 m. p. h. It was generally noted that the atmosphere was heavily laden with dust on the night of April 1 and most of the day on April 2.

The pollen traps were examined with a microscope at 9 a. m. on April 3. Examination was first made of the slide exposed in the open site. It was noted that many concentrated patches of small particles of what appeared to be silica, silt, or both, were present on the slide. Because

dust is normally distributed uniformly, the presence of dust patches seemed unique. These patches or "splashes" are shown in the photomicrograph in figure 1. Examination of the slide exposed in the pine tree grove disclosed the presence of opaque, rough-textured spheres of unknown identity. These are illustrated in figure 2. When touched with a dissecting needle the spheres shattered readily, forming concentrated patches of small particles similar to those observed on the first slide. The spheres, now clearly identified as composite dust bodies, were found to be made of particles identical in appearance to those observed in the dust patches on the first slide examined. Thus, the presence of the dust spheres explained the formation of the concentrated dust patches.

It is believed that there were no dust spheres on the slide exposed in the open situation because the unobstructed wind currents caused the spheres to strike the slide with sufficient force to shatter them. By the same token the pine tree grove slowed the wind currents suffi-

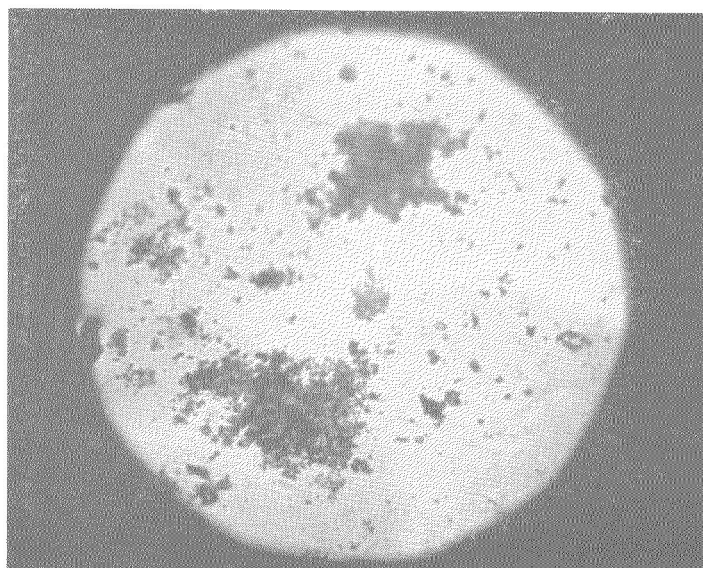


FIGURE 1.—Typical concentrated dust particle patches formed by atmospheric dust spheres shattering on impact with the slide surface.

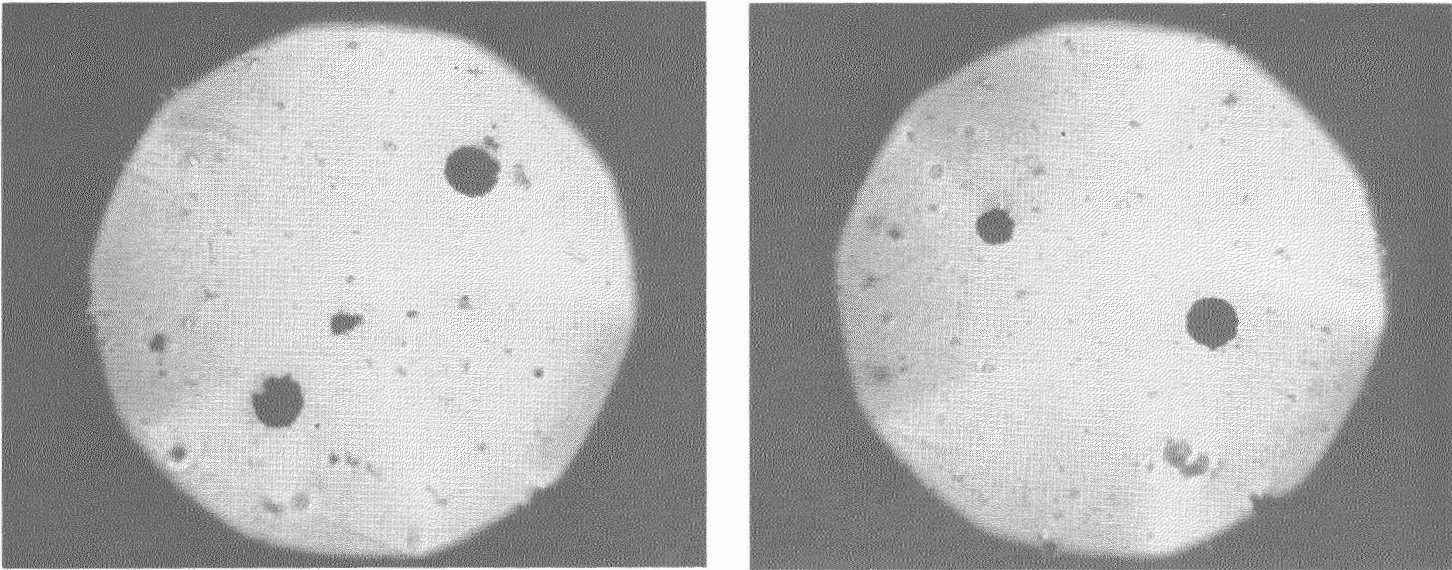


FIGURE 2.—Examples of opaque, rough-textured atmospheric dust spheres.

ciently to permit the dust spheres to settle on the slide gently and intact.

3. PHYSICAL CHARACTERISTICS

Twenty dust spheres and as many dust patches were measured. Averages and extremes are given in the following table.

	<i>Dimensions in mm.</i>		
	<i>Maximum</i>	<i>Minimum</i>	<i>Average</i>
Dust sphere diameters.....	0.066	0.028	0.053
Dust patch widths.....	.406	.084	.170
Dust patch lengths.....	.462	.112	.234

The very largest individual particles making up the biggest dust spheres average 0.022 mm. in length and 0.015 mm. in width. Only one or two particles of this size occur in even the biggest spheres. Most particles are extremely small in relation to sphere size and it is believed that some are so minute as to be beyond the limits of resolution of an optical microscope. For this reason the average number of particles per sphere of a given size could not be determined.

Dust patch distribution per square mm. of slide surface averages 0.8. Dust spheres average 1.4 per square mm.